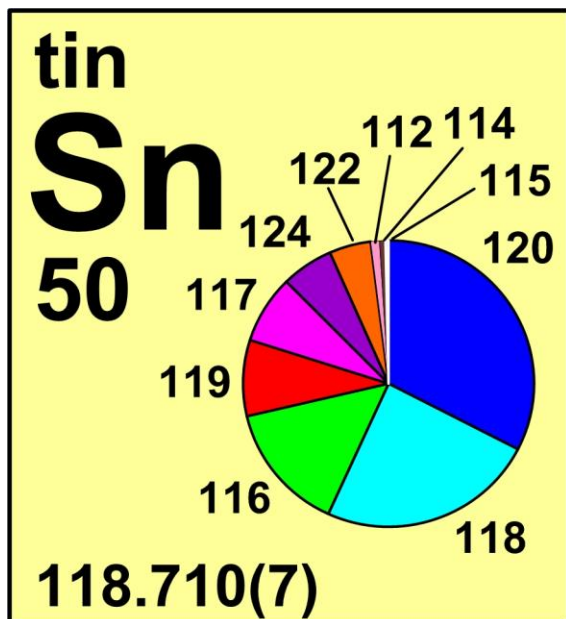


tin



Stable isotope	Atomic mass*	Mole fraction
¹¹² Sn	111.904 818	0.0097
¹¹⁴ Sn	113.902 779	0.0066
¹¹⁵ Sn	114.903 342	0.0034
¹¹⁶ Sn	115.901 741	0.1454
¹¹⁷ Sn	116.902 952	0.0768
¹¹⁸ Sn	117.901 603	0.2422
¹¹⁹ Sn	118.903 308	0.0859
¹²⁰ Sn	119.902 1947	0.3258
¹²² Sn	121.903 439	0.0463
¹²⁴ Sn	123.905 2739	0.0579

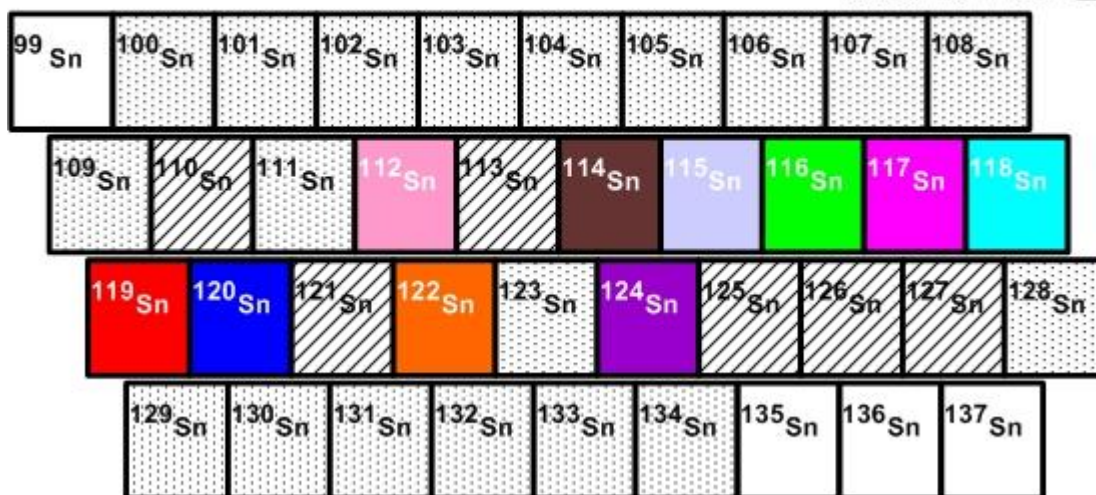
* Atomic mass given in unified atomic mass units, u.

Half-life of radioactive isotope

Less than 1 second

Between 1 second and 1 hour

Greater than 1 hour



Important applications of stable and/or radioactive isotopes

Isotopes in medicine

- 1) ^{117m}Tin Stannic Diethylenetriaminepentaacetic Acid (^{117m}Sn DTPA) is used routinely for diagnostic bone imaging and treatment of bone pain caused by osteometastases. It has been found that by using ^{117m}Sn DTPA, marrow toxicity can be reduced and the therapeutic efficacy of using radionuclides is maintained.

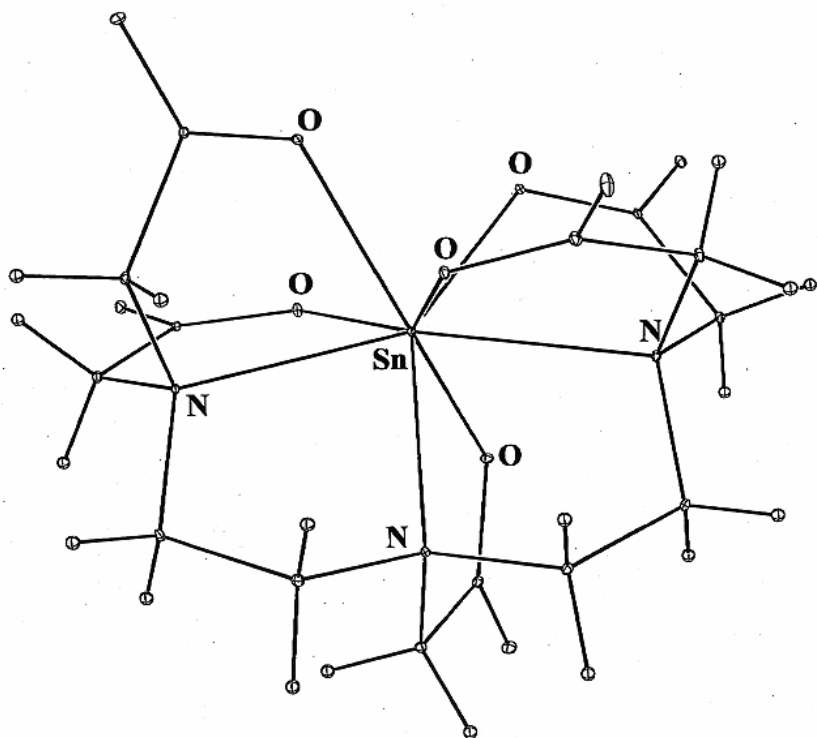


Figure 1: X-ray crystal structure of Sn (4+) DTPA Complex

- 2) ^{117m}Sn is a promising radionuclide for therapeutic applications since it decays through isomeric transition with the emission of monoenergetic conversion electrons, which causes less damage to the healthy tissues and bone marrow. The properties of ^{117m}Sn make it useful for the treatment of inflammatory synovial disease (i.e. rheumatoid arthritis) and this use is currently being investigated.
- 3) ^{112}Sn is used to produce the radioisotope ^{113}Sn . This is used for $^{113}\text{Sn}/^{113m}\text{In}$ indium generators for the elution of ^{113m}In as chloride for blood pool imaging including placenta localization.
- 4) ^{117m}Sn is a medical radioisotope which is used in treating bone cancer and both ^{116}Sn and ^{117}Sn can be used in its production.